Chapter Three: Contents

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1. PRELIMINARY MODE CHOICE 1

1.1 IMPOSSIBLE TRANSIT 2
1.2 INCLUDING PARK AND RIDE 3

2. LONG WALKS 5

Chapter Three—Experiments in Mode Choice and Long Walks

This chapter describes two changes made to the activity set AS-2 to produce AS-4 to AS-6 (See Volume One (*Introduction/Overview*), Figure 2. In AS-4 and AS-5, initial mode assignments are changed for obvious problem cases. In AS-6, activity locations are changed for travelers making extremely long walks.

All of these changes are unnecessary at this stage of the model. They all could have been handled as part of the mode choice general methodology described in Volume Three (*Feedback Loops*), Chapter Five (*Mode Choices*). One of the reasons it was done here was for practice in collating the proper data and selecting the proper travelers and their activities for mode changes. It is useful to understand the scripts and methods given here before attempting to understand scripts and methods given in Volume Three (*Feedback Loops*), Chapter Five (*Mode Choice*).

1. Preliminary Mode Choice

The tours in the activity set are divided into three distinct groups:

- Origin and destination near transit (ONDN),
- Origin far but destination near transit (OFDN), and
- Destination is far from transit (DF).

Each tour is considered to originate at home. The primary destination is the work or school activity, or the shopping activity with the longest duration if there is no work or school activity. The primary destination of all other tours is the activity with the longest duration.

Tours in the ONDN group have their home location and primary anchor location near transit and are considered to be the population of tours that have transit as a viable mode. All of the transit tours will be chosen from this group. The OFDN has a primary anchor near transit, but the home location is far from transit. These tours are considered to have transit as a viable mode only if the tour is started (and ended) with a drive to (and from) a transit stop—Park and Ride. Tours in the final group, DF, have their destinations far from transit. Regardless of the proximity of transit to the home location, these people are assumed not to use the transit system.

The breakdown of total tours by access to transit is shown in Table 1. The first column lists the total number of tours in each transit classification category (as described above). The sum of these three numbers is the total number of tours in the simulation. The second column, entitled “non-shared,” contains the number of tours for each category that have no intra-household shared ride components. Any tour with any leg that is shared with another traveler is excluded from this count. The third column lists only those non-shared

tours that have been classified as auto, transit, or rail-only mode tours. Tours that are classified as walk-only mode, or magic-moves-only are excluded; all shared tours are also excluded. The final column contains only one number, which is the number of transit tours in the DF category. Since transit modes are infeasible for DF tours, it is encouraging that there are initially few of them.

Table 1. Tours by access to transit.

	total	non-shared	a, l, or t modes	non-auto
ONDN	493426	460392	432741	
OFDN	118504	107786	103677	
DF	138833	107364	86623	3047

1.1 Impossible Transit

When the household surveys were matched with the population in the initial run of the Activity Generator, no consideration of the accessibility to transit was considered. Mode selection, in general, is more complicated than what is described here and is deferred until the full mode feedback process in Volume Three (*Feedback Loops*), Chapter Five (*Mode Choice*). However, tours in the DF group have transit defined to be impossible, so all of those tours were placed on auto mode to create the AS-4 activity set.

All of the TRANSIMS programs and scripts used to create AS-4 from AS-3 are shown in Fig. 1, along with relevant input and output files. (There are additional files created but not used; they are not shown.) First, all activities are classified by tour. An iteration database with all of the fields necessary to classify tours is created with the Collator. It has all fields necessary to classify and re-mode tours in this and the next section. The config file used is *allstr.bytour.cfg*; it is included in Volume Seven (*Appendix: Scripts, Configuration Files, Special Travel Time Functions*), Chapter Six (*AS-4*).

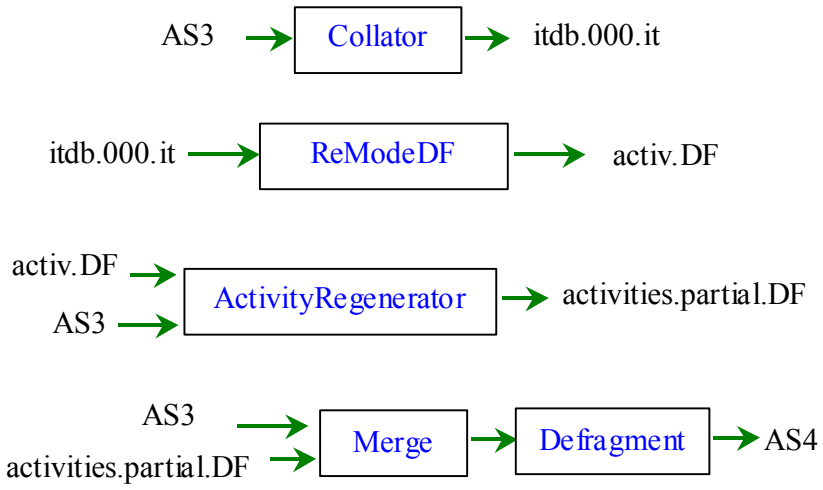

Fig. 1. Changing from transit to auto in DF tours.

The iteration database contains the distance to transit of the home and primary anchor locations, as well as the modes used on the tour. If any transit modes were used on the tour, the *ReModeDF* script adds a line to the Activity Regenerator feedback command file (*activ.DF*) expressing the change of mode to auto for every trip in the tour using the transit mode.

The feedback command file is then used in the Activity Regenerator to change any transit modes on DF tours in AS-3 into auto modes. The result is a partial activity file containing any household that had a change. The configuration file used for the Activity Regenerator is *fixtransit.DF.cfg*.

The partial activity file is merged with the original AS-3 activity file to create the full AS-4 activity file, with all of the trips in AS-3, but with any DF transit modes converted to auto.

1.2 Including Park and Ride

In the survey activity set used by the Activity Generator, all of the Park and Ride trips were converted to general transit. The initial activities (AS-1 through AS-3), therefore, had no Park and Ride mode tours. Additionally, as with the other two groups (ONDN and DF), no examination of the distance of activity locations to transit stops was made when assigning the transit mode. For travelers whose home locations are far from transit, a transit trip ensures a long walk to the nearest transit stop. These trips are changed to Park and Ride in the AS-5 activity set. It should be noted that these Park and Ride tours are not calibrated at this stage.

It is not necessary to run the Collator on the AS-4 activities. The AS-3 tour database is the starting point. From here, all of the OFDN tours are selected, and those with transit mode have entries made in the feedback file (*activ.fix_PnR*) for every transit trip. The feedback commands use the Activity Regenerator `MS` command to remode the tours, one trip at a time. For the first trip in the tour, the mode is converted to activity mode 5: inbound Park and Ride. For the last trip in the tour, the mode is converted to activity mode 6: outbound Park and Ride. The configuration file used was *fixtransit.PnR.cfg* and is included in Volume Seven (Appendix: *Scripts, Configuration Files, Special Travel Time Functions*) Chapter Fourteen (*Mode Feedback*) with the *ReModeOFDN* script. After merging changed households with the AS-4 activities, a complete activity set, AS-5, is generated.

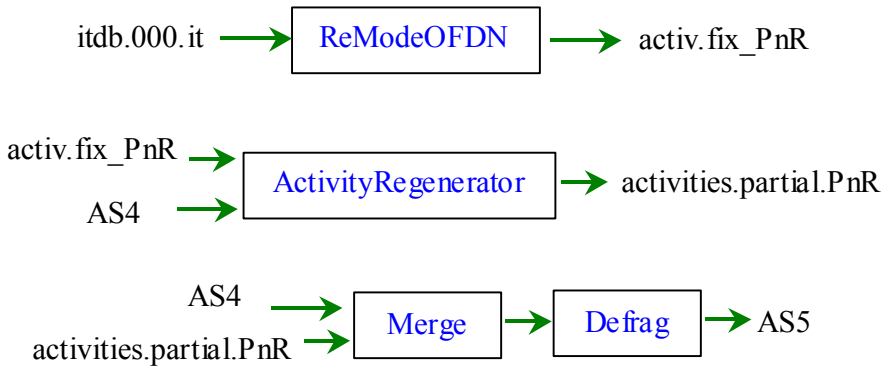

Fig. 2. Changing OFDN tours for Park and Ride.

2. Long Walks

Many travelers in the initial activity set were assigned the walk mode from the survey when the location chosen was much too far for a walk trip. Unlike the mode changes made to the activity set in the previous section, to correct long walks the locations of the activities are changed.

An attempt at correcting long walks was made when the bus trips were corrected in AS-2. It was discovered that, after iteration, there were still a large number of them remaining. This was in part because these trips were to activity locations of a particular type (work, shop, etc.) that did not exist near (within walking distance of) the location of the previous activity. The solution is to change the activity location attractors in the TRANSIMS network Activity Location Table so that every location has an infinitesimal, but non-zero, attraction for each type of activity. A walk activity that had no viable locations using the old attractors would resort to using any nearby activity location, and choose one within walking distance. It is recommended that, in all studies, an infinitesimal, but non-zero, attractor for each activity type be assigned to each activity location.

The feedback process correcting long walks is shown in Fig. 3. The first step is to create an iteration database. Since this can take a long time for large activity sets, we do this step in parallel and merge the results into a single database called *itdb.000.it*. That database is used as input to the script that creates the activity feedback file, *walks.act.fdbk*. For every walk trip between locations separated by more than 2500 meters Euclidean distance, or bike trips separated by more than 7500 meters, the script issues an `LTR` feedback command to change all locations on the tour. Also in the feedback command is the optional location coefficient multiplier (normally 1.0). In the feedback command, this multiplier is increased by a multiplicative factor of 1.05. The effect of the multiplier is to increase the cost of locations further away in Euclidean distance. In addition to the feedback command file, a field is added to the configuration file (*fixwalks.cfg*), which increases the travel time exponents in the location choice model. The combined effect will be to make trips to further locations, and therefore at increased travel time, less likely to be chosen for the long walk tours. Both methods proved equally effective. This combined method is used here.

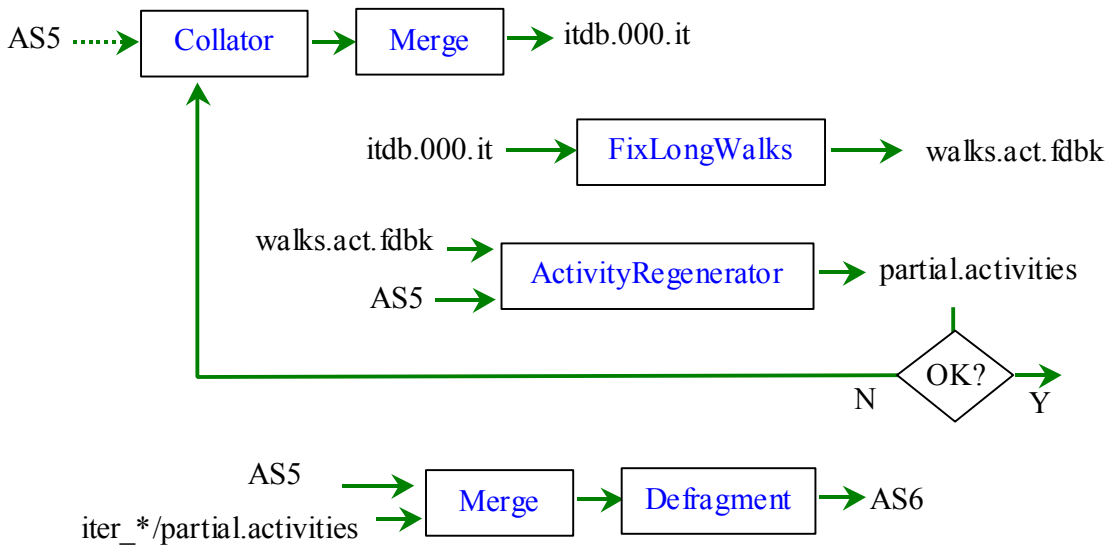

Fig. 3. Correcting long walks.

The feedback command file is used to create a new set of activities that have closer locations for long walks. The partial activities that are created have their long walks counted. If the number is larger than 200, the process repeats with higher multipliers. Each time, the previous multiplier is increased by 0.05. The second iteration has multipliers of 1.10. The process is repeated until there are fewer than 200 long walks, or until the combination of multipliers and the known longest-distance trip is the shortest possible given the attractors on the network. When either of these conditions is met, the next iteration through the loop converts all `LTR` feedback commands into `MS` feedback commands, and the long walks are changed into interhousehold shared rides.

Because each iteration operates on only the failed long walks of the previous iteration, all of the iterations' results must be merged, keeping only the newest activities for each household. After each iteration, all of the data and configuration files were moved into iteration directories so that the configuration files did not need to be changed, and the same file names could be used each time. The merge step includes the original AS-5 activities, as well as all partial activities in *iter_** directories, where "*" is the set of all iteration numbers. The final activity set is defragmented and called AS-6.